REMARKS

It is respectfully requested that this application be reconsidered in view of the above amendments and the following remarks and that all of the claims remaining in this application be allowed.

Amendments

At the outset, the amendments made herein are requested solely to expedite the prosecution of what is believed to be allowable subject matter. Applicants specifically reserve the right to file one or more continuation/divisional applications to present claims directed to the canceled subject matter.

Objection to the Abstract

The abstract has been rewritten to comply with the requirement that it be presented as a single paragraph.

Amendments to the Specification

The term "monomer" has been replaced by "terpolymer" to correct a typographical error. It would be clear to one of ordinary skill in the art that when referring to ethylene-propylene-diene that terpolymer is the correct appellation. Accordingly, no new matter has been added by this amendment.

Amendments to the Claims

Claim 1 has been amended to remove the recitation of "having maximum purity". Support for this is found on page 4 lines 8-10. In addition this claim has been amended to more properly recite "A material".

Claim 2 has been amended to recite "The method" of claim 1 as suggested by the Examiner.

Claim 3 has been amended to recite "The method" of claim 1 as suggested by the Examiner. In addition claim 3 has been amended to recite proper Markush language.

Claim 4 has been amended to recite "The method" of claim 1 as suggested by the Examiner. Claim 4 has also been amended to recite proper Markush language. The term "monomer" has been replaced with "terpolymer" to more accurately describe Applicant's invention.

Claim 5 has been amended to recite "The method" of claim 1 as suggested by the Examiner. In addition claim 5 has been amended to recite proper Markush language.

Claim 6 has been amended to recite "The method" of claim 1 as suggested by the Examiner.

Claim 7 has been amended to recite "The method" of claim 1 as suggested by the Examiner, and to remove the recitation of the term "simple conducting polymer".

Claim 8 has been amended to recite "The method" of claim 1 as suggested by the Examiner.

Claim 9 has been amended to recite "The method" of claim 1 as suggested by the Examiner. In addition claim 9 has been amended to recite proper Markush language.

Claim 10 has been amended to recite "A method" in place of "method".

Claim 11 has been amended to recite "The material" of "claim 17". By correcting the claim from which claim 11 depends, the proper antecedent basis has been established. In addition claim 11 has been amended to recite proper Markush language.

Claim 12 has been amended to recite "The material" of "claim 17". By correcting the claim from which claim 12 depends, the proper antecedent basis has been established. In addition claim 12 has been amended to recite proper Markush language.

Claim 13 has been amended to recite "The material" of "claim 17". By correcting the claim from which claim 13 depends, the proper antecedent basis has been established. In addition claim 13 has been amended to recite proper Markush language.

Claim 14 has been amended to recite "The material" of "claim 17". By correcting the claim from which claim 14 depends, the proper antecedent basis has been established.

Claim 15 has been canceled, without prejudice.

New claims 16 through 18 have been added. Support for these claims maybe found on page 2 line 5 to page 3 line 3 of Applicant's specification. No new material has been added by the addition of these claims.

A marked-up version of the claims is attached hereto as Appendix A.

Rejection Under 35 U.S.C. §102(b)

The Examiner has rejected claims 9-15 for allegedly being anticipated by Conn *et al.* (WO 96/21694). For the following reasons, this rejection is traversed.

Claims 9 - 15 are drawn to a material having improved resistance to thermal ageing, comprising a combination of 10 to 5000 ppm of conducting polymer dispersed in an insulating polymer **and** a heterogeneity size of 0.1 μm or less, as observed by electron microscopy. The non-conductive polymers of the present invention have conductivities of about 10^{-9} S/cm.

Contrarily, the cited material is a conductive polymer, as shown at page 3 lines 25-30 of the reference: "The electrical conductivity of the composite preferably lies in the range 0.001-50 S/cm". At its lowest, this represents a conductivity that is six orders of magnitude greater than the claimed material.

In addition the material in the Conn reference does not display high thermal stability over long periods of time.

In order for a reference to be considered anticipatory, each and every claim element must be claimed or disclosed. Applicants submit that Conn *et al.* does not anticipate the present invention because it does not disclose both the 10 to 5000 ppm of conducting polymer dispersed in an insulating polymer **and** a heterogeneity size of 0.1 μm or less. Withdrawal of this rejection is respectfully requested.

Rejection Under 35 U.S.C. §103(a)

Claims 1-15 stand rejected under 35 U.S.C. §103(a) over Han *et al.* (U.S 5,254,633) in view of Conn *et al.* (WO/9621694). For the following reasons, this rejection is traversed.

The claimed invention relates to a material, and the method for making a material, having improved resistance to thermal ageing, comprising a combination of 10 to 5000 ppm of conducting polymer dispersed in an insulating polymer **and** a heterogeneity size of 0.1 μm or less, as observed by electron microscopy. The non-conductive polymers of the present invention have conductivities of about 10^{-9} S/cm.

The invention lies in the materials very high thermal stability over time, in particular in its resistance to oxidation as explained on page 2, lines 5-7. In addition this property is shown in Example 1 (page 7, line 17 to page 8, line 3), Example 2 (page 8, line 24 to page

9 line 14) and Example 3 (page 9, line 31 to page 10, line 9). The state of the art for adding antioxidants to insulating polymers to increase resistance to thermal ageing at the time this invention was made involved adding molecules of fairly low molecular weight to the polymer. These molecules tended to migrate toward the outer surface of the film, and were not as successful at reducing thermal ageing. The high thermal stability of Applicant's material is due to the **combination** of the 10 to 5000 ppm of the conducting polymer **and** of the heterogeneity size of 0.1 μm or less.

This product is particularly characterized by the degree of heterogeneity. As to the method claims, this heterogeneity is achieved by a first impregnation phase of the insulating polymer granules with a solution containing the conducting polymer, which leads to a very good mixture having the required heterogeneity of 0.1 μm or less. Contrarily, producing such a material by direct mixing of powders or granules **does not** lead to the required heterogeneity of 0.1 μm or less, or to any improvements in the ageing properties of materials containing conducting polymer levels on the order of 1000 ppm (see page 3, line 32 to page 4, line 2; and above referenced Examples 1 - 3).

Han *et al.* does not address the matter of high thermal stability over time, especially with respect to oxidation, of the insulating material. Han, further, does not disclose or suggest that the concentration of 10 to 5000 ppm of conducting polymer dispersed in an insulating material **and** heterogeneity of less than 0.1 micron allows such surprisingly high thermal stability, especially against oxidation. To the contrary, it discloses concentrations of from 50 weight percent to less than 6 weight percent of the conducting polymer (see column 4 lines 41-67), which teaches away from concentrations as small as 0.001-0.5 weight percent as in Applicant's claimed invention.

Furthermore Han teaches that the particle size is not critical and may vary widely from 10^{-18} cm^3 to 1 cm^3 (see column 5, lines 16-27), which results in a heterogeneity of substantially 1 cm.

Conn teaches, as discussed above, a material that is substantially conducting, when compared to Applicant's material, and does present improved resistance to thermal ageing.

The references alone or combined do not teach or suggest all of the elements of Applicant's invention, namely an insulating material with improved resistance to thermal ageing, comprising a combination of 10 to 5000 ppm of conducting polymer dispersed in an insulating polymer and a heterogeneity size of 0.1 μm or less. Withdrawal of this rejection is respectfully requested.

Applicants submit that this application is now in condition for allowance, and a Notice to that effect is earnestly solicited. Attached hereto is a marked-up version of the changes made to the claims by the current amendment.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: Julie L. Heinrich

Julie L. Heinrich
Registration No. 48,070

Post Office Box 1404
Alexandria, Virginia 22313-1404
(650) 622-2300

Date: August 6, 2002

APPENDIX A

Marked-Up Copy of the Claims

1. (amended) **A m[M]**ethod for producing insulating materials having improved resistance to thermal ageing, characterized in that it comprises the steps consisting of:

- dissolving at least one conducting polymer **[having maximum purity]** in an organic solvent, so as to form an impregnating solution,
- impregnating granules, formed of an insulating polymer or of a mixture of insulating polymers, with said impregnating solution,
- evaporating the solvent so as to obtain granules of insulating polymer coated with a conducting polymer,
- drying said granules,
- extruding or hot mixing said granules to form a homogeneous mixture.

in which the conducting polymer represents 10 to 5000 ppm of insulating polymer.

2. (amended)**[Production]**The method according to claim 1, characterized in that the impregnation of the granules is made by dipping the latter in the impregnating solution.

3. (amended)**[Production]**The method according to claim 1, characterized in that the insulating polymer is **[chosen from among the]** a thermoplastic resin**[s such as]** selected from the group consisting of acrylic, styrene, vinyl resins **[or]** cellulose resins, **[or from among]**polyolefins, fluorine-containing polymers, polyethers, polyimides, polycarbonates, polyurethanes, silicones, **[their copolymers or]**and mixtures **[between]**of homopolymers and copolymers thereof.

4. (amended)**[Production]**The method according to claim 1, characterized in that the insulating polymer is **[chosen from among]**selected from the group consisting of polyethylene, low density polyethylene, high density polyethylene, linear low density polyethylene, polypropylene, ethylene-propylene-diene **[monomer]**terpolymer, fluorine-containing polyvinylidene, ethylene butacrylate **[or the]**and copolymers of ethylene and vinyl acetate, either alone or in a mixture.

5. (amended)**[Production]**The method according to claim 1, characterized in that the insulating polymer is **[chosen from among the]** a thermosetting resins, **[such as]selected from the group consisting of** polyesters, epoxy resins **[or]and** phenol resins.

6. (amended) **[Production]**The method according to claim 1, characterized in that the conducting polymer has a conductivity of at least approximately $10^{-9}S.cm^{-1}$.

7. (amended)**[Production]**The method according to claim 6, characterized in that the conducting polymer is **[a simple conducting polymer,]**a conducting polymer grafted onto an insulating polymer, or a copolymer containing at least one conjugate system.

8. (amended)**[Production]**The method according to claim 6, characterized in that the conducting polymer is **[chosen from among]selected from the group consisting of** polythiophene, the polyalkylthiopenes, polyaniline, polypyrrole, polyacetylene, polyparaphenylene, **[their derivatives or their]and** mixtures **thereof**.

9. (amended)**A m[M]**aterial obtained with the method according to any of claims 1 to 8.

10. (amended)**[Use of]A method of using** the insulating material having improved thermal resistance obtained with the method according to any of claims 1 to 8, for the manufacture of high and/or very high voltage cables.

11. (amended)**The m[M]**aterial having improved resistance to thermal ageing according to claim **[2]16**, characterized in that the insulating polymer is **[chosen from among the] a** thermoplastic resin**[s such as] selected from the group consisting of** acrylic, styrene, vinyl **resins [or]** cellulose resins, **[or from among]**polyolefins, fluorine-containing polymers, polyethers, polyimides, polycarbonates, polyurethanes, silicones, **[their copolymers or]and** mixtures **[between]of** homopolymers and copolymers **thereof**.

12. (amended)**The m[M]**aterial having improved resistance to thermal ageing according to claim **[2]16**, characterized in that the insulating polymer is **[chosen from among]selected from the group consisting of** polyethylene, low density polyethylene, high

density polyethylene, linear low density polyethylene, polypropylene, ethylene-propylene-diene **[monomer]**terpolymer, fluorine-containing polyvinylidene, ethylene butacrylate **[or the]**and copolymers of ethylene and vinyl acetate, either alone or in a mixture.

13. (amended) The m**[M]**aterial having improved resistance to thermal ageing according to claim **[2]**16, characterized in that the insulating polymer is **[chosen from among the]** a thermosetting resins, **[such as]**selected from the group consisting of polyesters, epoxy resins **[or]**and phenol resins.

14. (amended)The m**[M]**aterial having improved resistance to thermal ageing according to claim **[2]**16, characterized in that the conducting polymer has a conductivity of at least approximately $10^{-9}S.cm^{-1}$.

15. (canceled)

16. (new)An insulating material having improved resistance to thermal ageing, containing 10 to 5000 ppm of a conducting polymer dispersed in an insulating polymer and whose heterogeneity size is 0.1 μm or less, as observed under scanning electron microscopy.

17. (new)The material having improved resistance to thermal ageing according to claim 14, characterized in that the conducting polymer is a conducting polymer grafted onto an insulating polymer, or a copolymer containing at least one conjugate system.

18. (new)The material having improved resistance to thermal ageing according to claim 14, characterized in that the conducting polymer is selected from the group consisting of polythiophene, the polyalkylthiopenes, polyaniline, poly-pyrrole, polyacetylene, polyparaphenylene, and mixtures thereof.